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[54] CAPACITY MODULATED SCROLL MACHINE

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[58] Field of Search 418/55.5, 57; 417/212, 417/214, 44.11, 44.2

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[57] ABSTRACT

A scroll-type machine is disclosed which is particularly well suited for use as a compressor in refrigeration and air conditioning systems and incorporates a unique arrangement for modulating the capacity thereof. In one group of embodiments the capacity of the scroll-type machine is modulated by relative axial movement between the scroll members so as to form a leakage path across the wrap tips and opposed end plates. In another group of embodiments, modulation is achieved by reducing the orbital radius of one of the scroll members to thereby form a leakage path across the flank surfaces of the wraps. Both types of scroll separation may be accomplished in a time pulsed manner to thereby enable a full range of modulation with the duration of the loading and unloading periods being selected to maximize the efficiency of the overall system. A motor control arrangement is also disclosed which may be used with either of the modulation methods mentioned above to increase the efficiency of the motor during periods of reduced load. Additionally, either of the modulation arrangements mentioned above may be combined with a delayed suction form of capacity modulation with or without the motor control feature to thereby achieve better operating efficiency under certain conditions.

102 Claims, 28 Drawing Sheets

